MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

PEM0016 – ALGEBRA

(All sections / Groups)

30 MAY 2017
2.30 p.m. – 4.30 p.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 4 pages including the cover page.
2. Attempt **ALL FOUR** questions. All questions carry equal marks and the distribution of marks for each question is given.
3. Please write all your answers in the Answer Booklet provided. All necessary working **MUST** be shown.
4. Only **NON-PROGRAMMABLE** calculator is allowed.

QUESTION 1 [25 marks]

(a) Solve the equation $\sqrt{2x+3} - \sqrt{x-2} = 2$. [13 marks]

(b) Solve the inequality $\frac{3x-3}{5x-2} \geq -6$ and express the answer using **interval notation**.

[7 marks]

(c) Use Binomial Theorem to expand $(3x - y)^5$. [5 marks]

QUESTION 2 [25 marks]

(a) Solve the equation $9^{(x^2)} = 27^{(x+3)}$ [7 marks]

(b) Solve the equation $\log_{10}(x+3) + \log_{10} x = 1$ [6 marks]

(c) The function $f(x) = \frac{5-3x}{7-4x}$ is one-to-one. Find the inverse of f. [6 marks]

(d) Give the transformation which produces the following graphs from the graph of $y = f(x)$.

(i) $y = f(x+4)$ [2 marks]

(ii) $y = 4f(x)$ [2 marks]

(iii) $y = -f(x)$ [2 marks]

Continued...

QUESTION 3 [25 marks]

(a) Given a polynomial function $f(x) = x(x - \sqrt{3})^2$. Determine the behaviour of graph near each x-intercept and sketch the graph of $f(x)$.

[5 marks]

(b) Given a polynomial function $f(x) = 5x^3 - 17x^2 - 14x + 8$. Find all the real zeros of $f(x)$ and write $f(x)$ in factored form.

[10 marks]

(c) Find the partial fraction decomposition of $\frac{25x^2-4x-53}{(3x^2-2x-5)(x+2)}$. [10 marks]

Continued...

QUESTION 4 [25 marks]

(a) Given matrix $A = \begin{bmatrix} 7 & 5 \\ -3 & 2 \end{bmatrix}$. Find the value of p and q if $A^2 = pI^2 + qA$,

where I is 2x2 identity matrix.

[7 marks]

(b) Solve $\begin{vmatrix} k & 1 \\ k-1 & 2 \end{vmatrix} = 7k + 4$. [3 marks]

(c) Solve the system using **inverse matrix method**.

$$\begin{cases} -x + 7y - 5z = 10 \\ 4x - 3y + 2z = -9 \\ x - y + 2z = 8 \end{cases}$$

[15 marks]

End of Paper